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## RURAL AREAS IN POLAND IN THE CONTEXT OF CHANGES IN POPULATION AGE STRUCTURE IN 1996, 2001 AND 2006

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**ABSTRACT.** The article presents changes in the rural age structures in Poland as observed in the years 1996, 2001 and 2006. The changes in population numbers are analysed with respect to age groups, the aging index and the old-age rate. Regarding its spatial scope, the article covers rural areas in Poland and the basic territorial units it uses are rural communes and the rural parts of mixed rural-urban communes that altogether amount to 2,171 units (as of 2006). The obtained results are discussed in a broader context of urban as well as countrywide age structures.

**KEY WORDS:** Poland, rural areas, age structure, population aging.

### INTRODUCTION

Knowing and being able to predict trends in population age structure is one of the greatest challenges faced by sciences dealing with population research. Such knowledge is particularly valuable to countries with low natural increase, i.e. to most developed countries. Low numbers of births frequently exceeded by deaths and extending human longevity directly contribute to population aging. This process is building up in many regions of the world and especially in developed countries and it is perceived as a serious socio-economic problem. It affects education and school systems, the size and structure of employment, social security systems and old age pensions, as well as inducing demographic changes (e.g. by limiting reproduction or increasing death rates). The problem has become significant enough to become a field of research for a new interdisciplinary science called gerontology. The problem of population aging has drawn attention not only from demographers and geographers, but also from biologists, physicians, educationists, psychologists and anthropologists. This widespread

interest mainly stems from the fact that older persons represent an expanding share of the consumers of goods and services (medical, pharmaceutical, tourist, recreational and educational, etc.), voters and other target groups. It therefore becomes particularly important to be able to pinpoint changes in population age structure and determine the sizes of particular age groups.

Therefore, this article investigates changes occurring in the age structure of Polish population inhabiting rural areas in different parts of the country at the turn of the 21<sup>st</sup> century. The presented analysis deals with population age structure based on three age categories, i.e. pre-working age, working age and post-working age. The spatial scope of the discussion covers Polish rural areas and the basic territorial unit used in the article are rural communes and the rural parts of mixed rural-urban communes totalling 2,171 units (as of 2006). A study of all rural areas in Poland offers better knowledge of the spatial variations in population age structure. In this article, the structures are examined at quinquennial intervals, i.e. in 1996, 2001 and 2006. To make comparisons and in order to capture longer trends, the presented analysis additionally refers to data derived from earlier years (1950–2006).

The presented discussion assumes that population processes and structures change following overall demographic transition and transformation of spatial mobility that occur in the world together with progressing modernization processes giving a modern shape to a traditional society. Population age structure is formed by elements of natural growth (births, deaths, and migration) and it is characterised by constant changes (in both time and space). According to demographic transition theory, falling numbers of births (translating into a smaller proportion of pre-working age persons) are accompanied by decreasing mortality and extending human lifespan, which ultimately raises the average age of population and contributes to its aging. Additionally, modernization, technological progress and improving standard of living discourage migration from rural areas to towns, or even put an end to it. The article assumes that expanding urbanization, urban sprawl and a vogue for „living close to nature” are behind the growing numbers of town dwellers moving to rural areas who especially favour the outlying districts of larger towns. The tendency has its source in the improving accessibility of such areas (e.g., motor cars are commonly available now) and in their attractiveness, particularly in the eyes of young, working-age people who have their own families or plan to establish them soon. The process rejuvenates the suburbs and boosts natural increase there (Szymańska, 2000). Another assumption used in the study is that different levels of socio-economic development observed in Polish rural areas contribute to their different attractiveness to the prospective in-migrants. It is presumed that the most attractive areas to the working-age population are: (1) areas with good location, (2) well-developed areas (socio-economic centres), (3) rural

areas near large towns, (4) borderlands, and (5) areas with a strong capacity for tourism. The study also assumes that young in-migrants view as attractive areas where the average age of population is lower, as well as having a considerable proportion of the production-age population. In the peripheral areas, remote from large urban centres and relatively underdeveloped, different population trends are likely to form. The areas can be expected to have larger shares of older persons and thus higher mortality rates and higher aging indices.

It is worth bearing in mind that population age structures develop differently in rural areas and in towns. Reproduction rates usually fall faster in towns, life expectancy is longer (because of the different lifestyle and better access to specialist medical care) and the percentage of the working-age population is considerably higher (as more jobs are available). In contrast, the rural inhabitants show a more traditional approach to procreation and they generally live shorter lives. Moreover, the frequent unavailability of attractive local labour markets makes the members of rural population seek jobs away from their places of residence, which consequently deprives rural areas of young, mostly well-educated people.

There is a whole range of methods for presenting age structures, for instance, people can be grouped by their year of birth (an age pyramid) or an economic or biological criterion can be applied, etc. In this study, the source data are analysed using the economic criterion with respect to three age groups, i.e. a pre-working age group (0–17 years), a working-age group (women 18–59 years, men 18–64 years) and a post-working age group (women aged 60+ and men 65+). The first group includes persons who are essentially outside the labour force and its size in a given area shows how young the local population is as well as the local demographic potential. The working-age persons in the second age group are usually economically active and their proportion in the total population living in a given territorial unit defines the unit's economic potential. A large percentage of the third age group, whose members have generally withdrawn from the labour force, indicates the advancement of the aging process in an area (Holzer, 1994; Nazareth, 2000).

Poland belongs to the group of countries that have gone through demographic transition very fast and where economic transformations have come relatively early. Especially the latter process exposed the country's population to changes that could be earlier observed in developed countries. They have reshaped the family model, have contributed to the postponement of marriages until later and later years while reducing their numbers, and have brought down female parity (Van de Kaa's theory of second demographic transition) (Van de Kaa, 1987, 2003). According to demographic forecasts, in 2025 half of Polish population will be older than 45 years and five years later every fourth Pole will be a pensioner ([www.stat.gov.pl](http://www.stat.gov.pl)).

## POPULATION AGE STRUCTURE

The share of the pre-working age population (0–17) decreased in Poland between 1950 and 2006 by almost half (from 40% in 1950 to 20% in 2006 – Fig.1.). The decline was more distinct in the urban areas that lost more population in the age category. In the rural areas, where birth rates are larger, the proportion of the pre-working age population was invariably higher than in towns throughout the period. The coefficient of correlation ( $r$ ) between the population's share and the rural birth rate confirms that the two variables are interrelated. In 2006, the coefficient stood at 0.6478, testifying to their strong and positive correlation. Although 82% of children in Poland have legitimate parents and the rural rate is even 85%, the correlation between the percentage of the pre-working age population and the rate of new marriages turned out to be only 0.2534. This means that the correlation is weak and that the number of new marriages does not significantly increase the birth rate and thereby the proportion of the pre-working age population.

In 1996, the share of the pre-working age population in the total commune's population was  $\geq 25\%$  in 90 out of 100 rural communes. Five years later the ratio

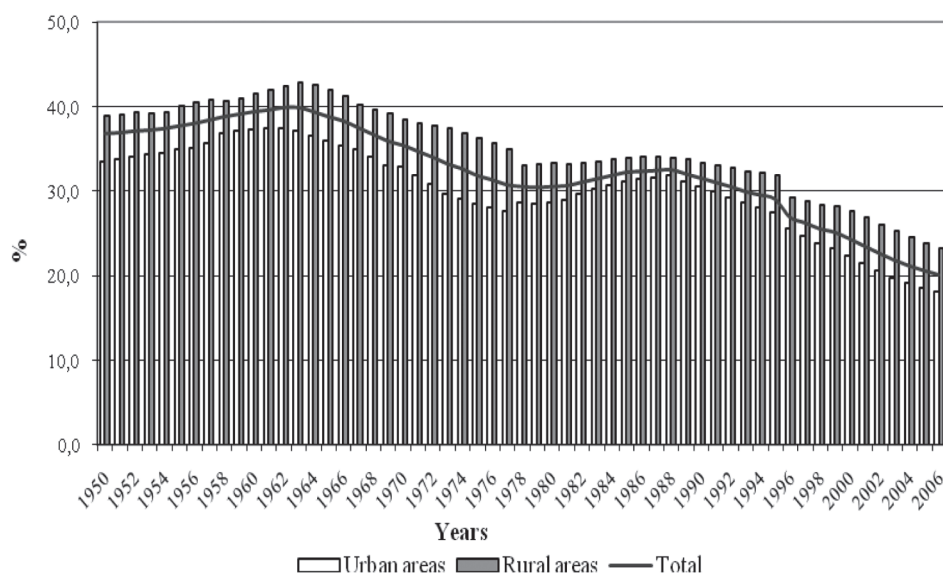


Fig. 1. Changing share of the pre-working age population in Poland, towns and urban areas between 1950 and 2006 (%)

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)

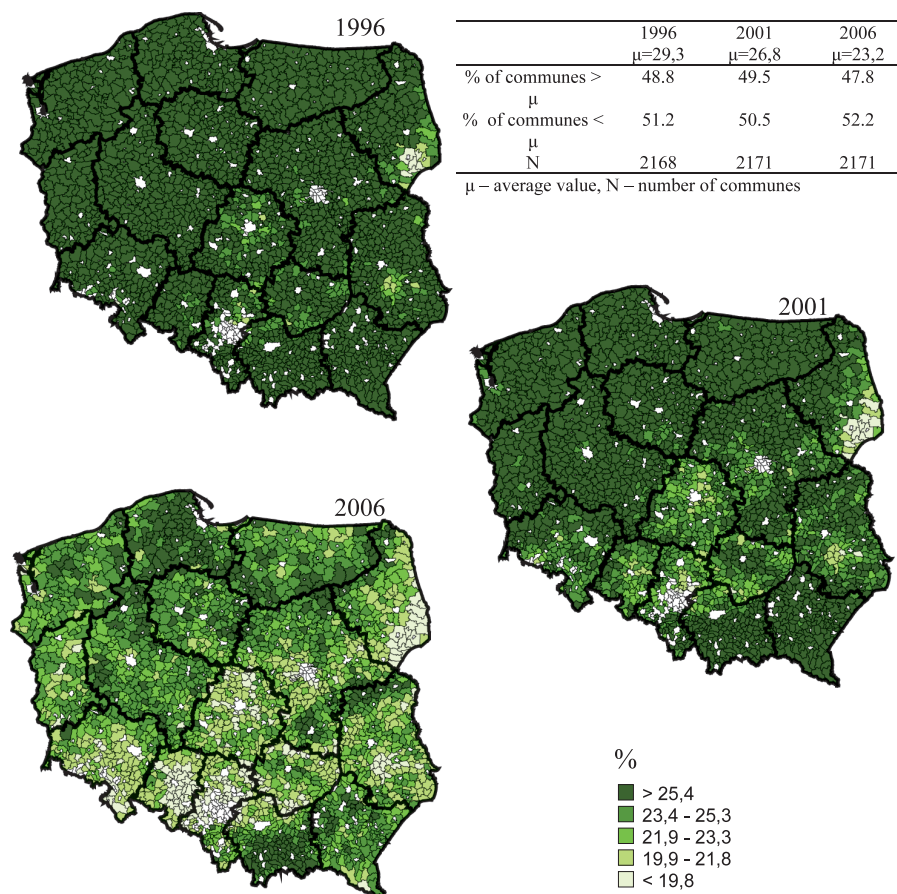


Fig. 2. Shares of the pre-working age population in total population inhabiting rural areas in Poland in 1996, 2001 and 2006 (%)

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)

was 70 to 100, falling in 2006 to only 10–20 to 100 (Tab. 1). The average share of the pre-working age population also decreased, falling from 29.3 in 1996 to 26.8 in 2001 and to 23.2% in 2006. In spatial terms (Fig. 2), in 1996 the proportion of the pre-working age population was below 25% in rural communes situated in the south-eastern part of the Podlaskie voivodeship, in some communes in the Śląskie voivodeship, and in few communes around Łódź and Lublin.

However, in 91% of Polish rural communes the rate was  $\geq 25\%$ . By the year 2001, their group visibly diminished (to 69% of all rural communes), forming a dense area in northern, western and southern Poland. In eastern Poland, and partly in her central and southern regions, areas where the shares of the pre-

working age population ranged from 22 to 25% became noticeable. In 2006, the shares were  $\geq 25\%$  in only 15% of all rural communes. Rural areas where they were rather high (above 22%) formed three, relatively dense zones. The first zone covered a large part of northern Poland, mainly the Warmińsko-mazurskie, Pomorskie, and Zachodniopomorskie voivodeships, as well as the northern part of the Mazowieckie voivodeship, the Kujawsko-pomorskie, Wielkopolskie and Lubuskie voivodeships; the second zone comprised the northern part of the Lubelskie and the southern part of the Mazowieckie voivodeships; and the third one involved the Podkarpackie voivodeship and the eastern part of the Małopolskie voivodeship. In the rest of the country the shares were much smaller, even 10% in some extreme cases (Fig.2).

The percentage of the working-age population in Poland changes as new waves of persons born during baby booms and baby slumps join the labour force (see Fig. 3). Between 1950 and 2006, the successive baby booms and baby slumps increased the share of the age category; in 1950, the share amounted to almost 58%, at the turn of the 1980s it stood at around 60% because of the first post-war baby boom, and the second baby boom raised it to 64% in 2006. The Polish baby boomers of the 1980s are reaching the working age today, enlarging the

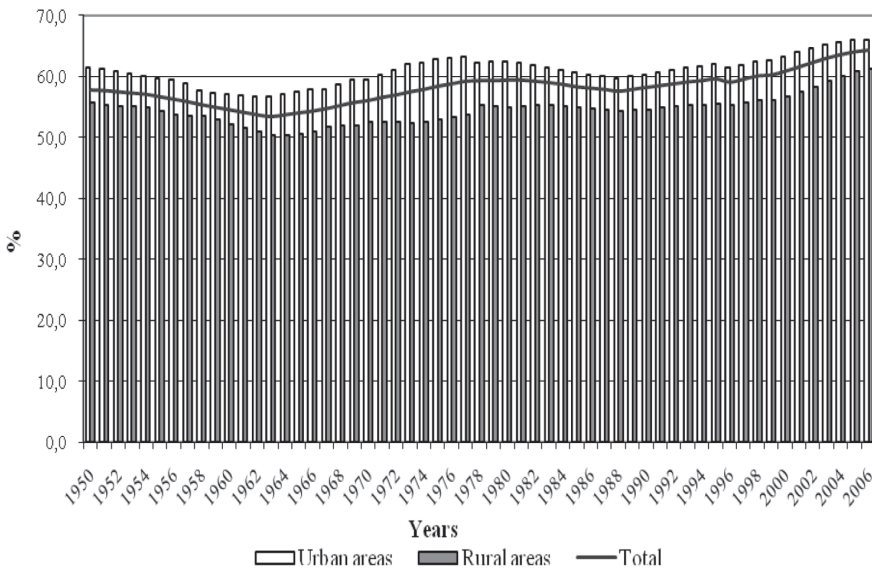


Fig. 3. Changing shares of the working age population in Poland, towns and rural areas between 1950 and 2006 (%)

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)



proportion of the working-age population. In the years 1996–2006, the proportion increased by around 5%, from 61% (1996) to 66% (2006) in towns and from 55% (1996) to 61% (2006) in rural areas; its overall value rose as well, from 59% in 1996 to 64% in 2006.

Basically, however, towns have larger working-age populations than rural areas and the disproportion even grows when the baby boomers reach working age. The share of the working-age population is largely shaped by the proximity of large and attractive labour markets. This relationship is especially noticeable in towns, suburban areas and the western parts of the country, where the service sector prevails and the level of socio-economic development is relatively high. The areas attract population at mobile age (18–44 years), whose inflow increases local shares of the working age population. In other words, the proportion of the working-age population in rural areas depends on the inflow rate of mainly urban population. The 2006 coefficient of correlation ( $r$ ) between the percentage of the working-age population and the urban population inflow to rural areas was 0.4916. This means that the magnitude of population inflow to rural communes is among the factors influencing the proportion of the working age population.

In 1996, the working-age populations were  $\leq 57.3\%$  in as much as 86.1% of rural communes in Poland. After five years, the group of the communes decreased to 50.9%, and then to 10.8% by 2006. In 1996, around 0.2% of rural communes had shares of the age category  $\geq 63.7\%$ , but within the next five years their proportion increased to 0.7%. Between 2001 and 2006, the shares were  $\geq 63.7\%$  in as much as 17.5% of rural communes (Tab.1). In 1996, 55.3% of population inhabiting rural areas were at working age, in 2001 the age group made up 57.5%, reaching 61.4% in 2006.

In spatial terms (Fig.4.), the western and northern parts of Poland had larger shares of the working-age population in the total population, while the largest ones ( $\geq 63.7\%$ ) were noted in the suburban areas of large towns and border areas. The eastern part of the country was different, as the shares of the working age population were usually smaller there, excluding the suburban area of the capital city of Warsaw having as high percentage of the working-age population ( $\geq 63.7\%$ ) as the suburban areas of towns in western Poland. It can be generally concluded that in the western and northern parts of Poland the rates of the working age population ranged from 60 to 64%, while in the eastern part the range was 55–59%.

Analysis of the share of the working-age population indirectly involves the examination of the magnitude and pace of population aging. Among the main factors determining population aging there are birth rates and migration balances. The coefficient of correlation between the share of the working age population and the rural birth rate was  $-0.4375$ , while the correlation between the share of

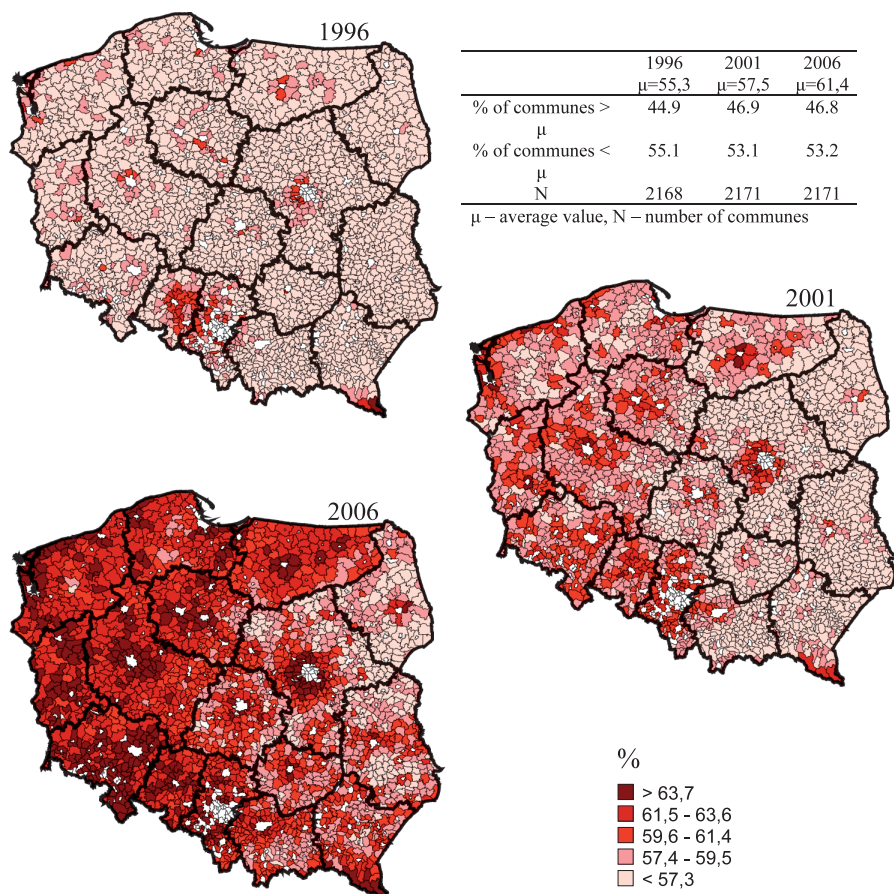


Fig. 4. Shares of the working age population in total population inhabiting rural areas in Poland in 1996, 2001, and 2006 (%)

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)

the post-working age population and the migration balance stood at  $-0.3672$ , proving a negative mean correlation. In other words, the lower the birth rate and population inflow, the higher the share of the post-working age population and vice versa. A large share of this age group yields a high mortality rate (a strong positive correlation –  $0.7297$ ) and a high aging index (a very strong positive correlation –  $0.9354$ ).

From 1950 to 2006, the post-working age population increased in Poland more than 2.5 times, rising from 5.3% in 1950 to 15.7% in 2006, and in rural areas from 5.4% to 15.4% (Fig.5.). It is worth noting that in the examined period



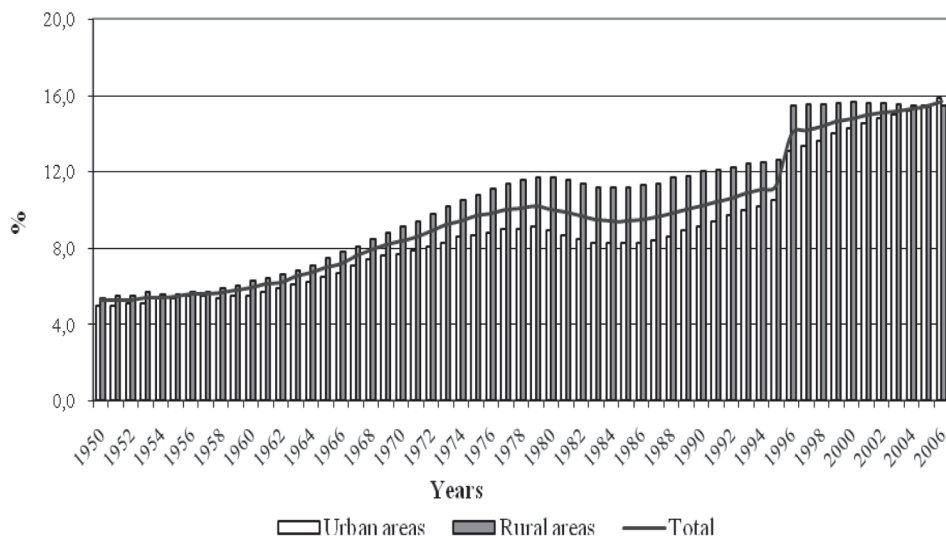


Fig. 5. Variations in the share of the post-working age population in Poland, towns and rural areas between 1950 and 2006 (%)

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)

the age group changed differently in rural areas and in towns. Over the several tens of years between the end of WWII and 2005 inclusive, a larger percentage of the post-working age population was a typically rural phenomenon. Particularly large differences between towns and rural areas could be observed in the 1970s, 1989s, and 1990s. With the beginning of the 21<sup>st</sup> c., the urban and rural shares of the age group started to converge toward each other and in 2006 the urban share was already larger.

As regards the spatial distribution (Fig.6.), in 1996, 2001 and 2006 the highest shares of the post-working age population ( $\geq 21.3\%$ ) were noted in the Podlaskie voivodeship, while high and medium ones ( $14.7\% - 21.2\%$ ) in the Mazowieckie, Łódzkie, Lubelskie and Świętokrzyskie voivodeships, excluding the suburban areas of large towns. Low shares ( $\leq 14.6\%$ ) were observed in the rural areas of northern and western Poland (because of the large proportions of the pre-working age and working-age populations), and in southern Poland (a large share of the pre-working age population). In 1996, 17.1% of rural communes had very low shares of the post-working age population ( $\leq 12.4\%$ ); by 2001 the group decreased to 14.3% and then slightly grew, to 15.4% in 2006. On the other hand, 8.4% of all communes in 1996 were in the highest band ( $\geq 21.3\%$ ), in 2001 the rate was 8.0%, and merely 7.1% five years later (Tab.1). The values suggest that the rural populations were somewhat rejuvenated.

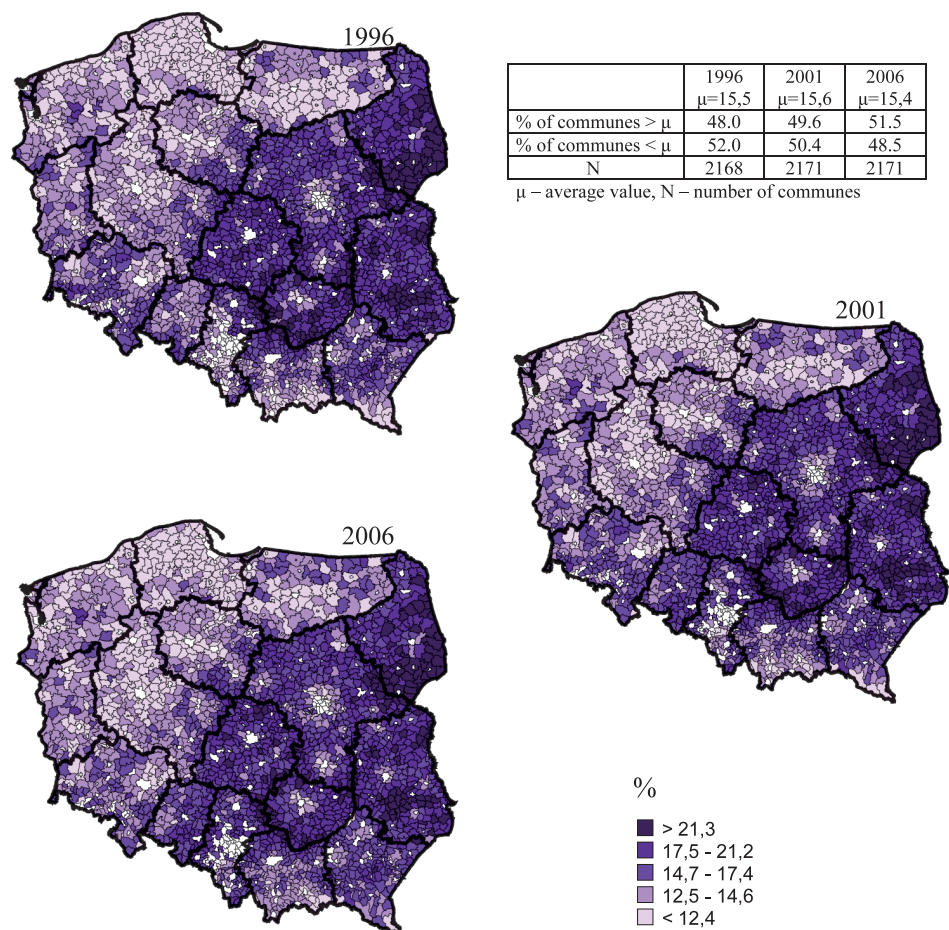


Fig. 6. Shares of the post-working age population in the total rural population in Poland in 1996, 2001 and 2006 (%)

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)

The advanced stage of population aging has made researchers seek better indicators that would allow more insightful investigations into the phenomenon. The range of the indicators includes the aging index and the old-age rate that have been used in this study to. The indicators have been developed by Z. Długosz (2002, 2003, 2004, 2007; see also Kurek, 2003, 2004). The aging index is defined as the ratio between persons aged 65+ and those aged 0–17 years ( $I_{SD}$ ). In 1996, the ratio was 52 to 100, but in 2006 it was already 78 to 100. In the analysed period, its value grew almost twice faster in towns than in rural areas. In 1996, it was 51 to 100 in towns and 53 to 100 in rural areas). A decade later, in 2006, the numbers

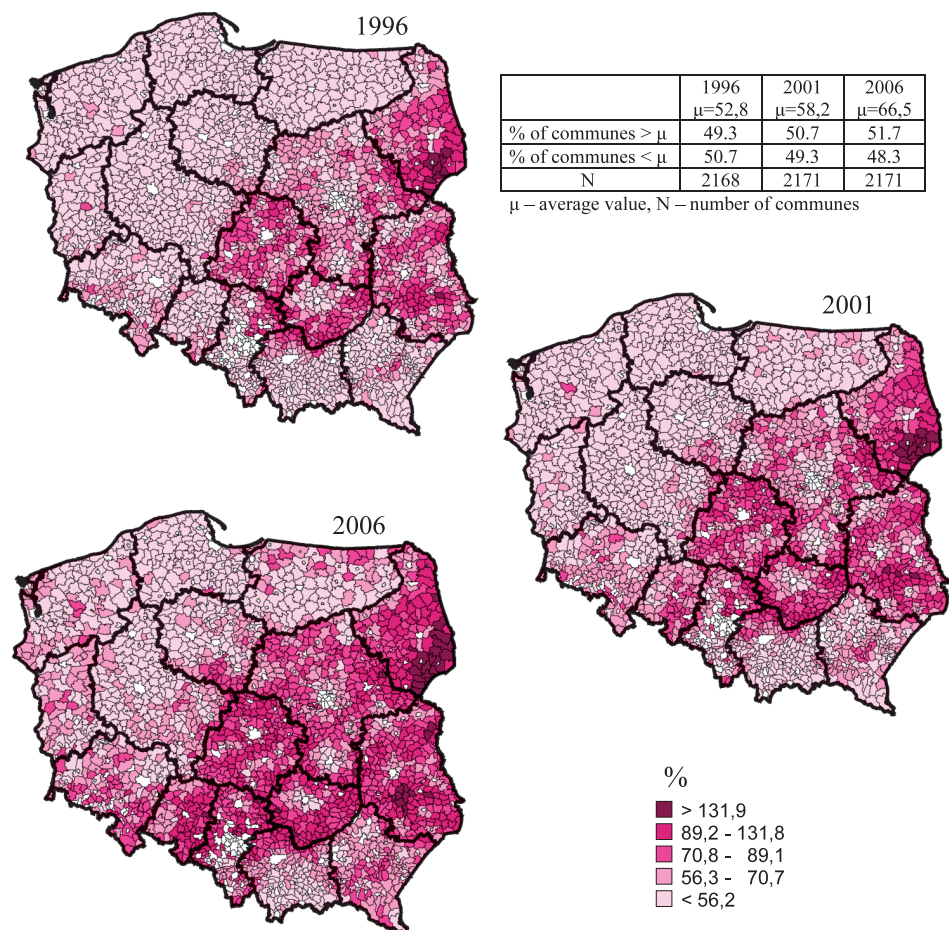


Fig. 7. Aging index values (persons aged 65+ to those aged 0–17) in rural areas in Poland in 1996, 2001, and 2006

*Explanation:*

$$I_{SD} = \frac{U(\geq 65) \cdot 100\%}{U(0-17)}$$

$U(0-17)$  – share of population aged 0–17 years

$U(\geq 65)$  – share of population aged 65 years and over

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)

were 88 and 67, respectively. Therefore, the urban aging index increased by 37 persons (from 51 to 88), while the rural one by 14 persons (from 53 to 67).

In spatial terms, in 1996 the highest values of the aging index ( $\geq 89.2$ ) were noted in the rural areas of eastern Poland, mainly in the present Podlaskie voivodeship, higher ones ( $\geq 70.8$ ) in the Łódzkie, Świętokrzyskie and Lubelskie

voivodeships, while in the Mazowieckie voivodeship they were lower ( $\geq 56.3$ ). In the other rural areas, the aging index was  $\leq 56.2$ . Within the next five years the area where the index was  $\geq 56.3$  extended to the Śląskie and Dolnośląskie voivodeships and to the north-western part of the Małopolskie voivodeship. In 2006, more voivodeships reached the level of 56.3, including the Podkarpackie, Lubuskie, Kujawsko-pomorskie, and Warmińsko-mazurskie voivodeships, as well as parts of Wielkopolskie, Zachodniopomorskie and Pomorskie voivodeships. In other words, the index value grew in the successive years covered by the analysis

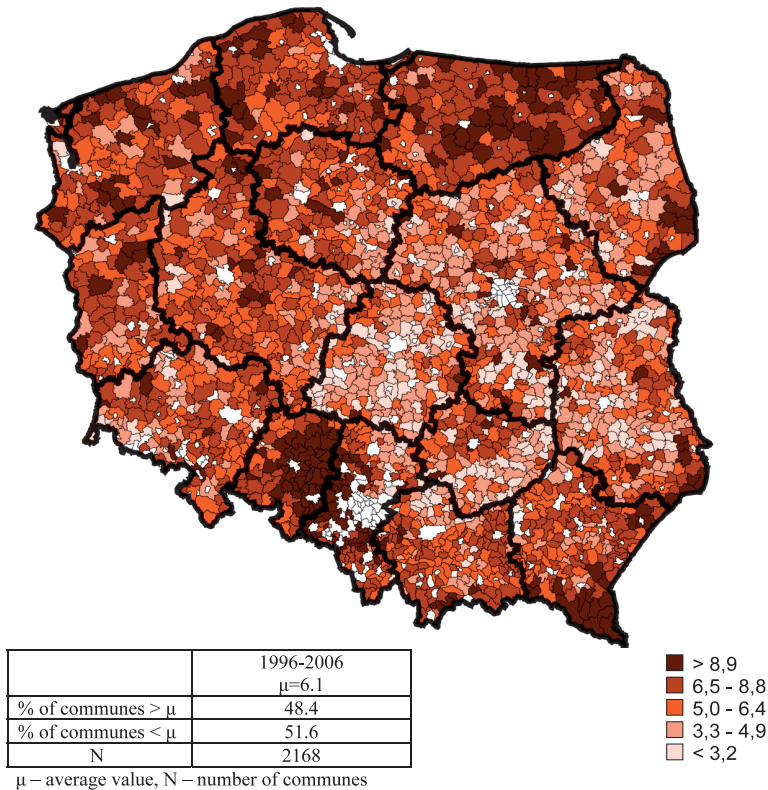


Fig.8. The rural old-age rate in Poland between 1996 and 2006.

*Explanation:*

$$W_{SD} = [U(0-17)_t - U(0-17)_{t+n}] + [U(\geq 65)_{t+n} - U(\geq 65)_t]$$

$U(0-17)_t$  – share of population aged 0–17 years at the beginning of the analysed period

$U(0-17)_{t+n}$  – share of population aged 0–17 years at the end of the analysed period

$U(\geq 65)_t$  – share of population aged 65 years and over at the beginning of the analysed period

$U(\geq 65)_{t+n}$  – share of population aged 65 years and over at the end of the analysed period

*Source:* Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)



in an increasing number of rural communes. For instance, in 1996 the highest band ( $\geq 131.9$ ) incorporated 0.4% of rural communes, 0.7% in 2001, and 1.7% in 2006.

The other indicator used in this study is the old-age rate (Długosz 2002, 2003, 2004, 2007). It is defined as a sum of a percentage decrease in the pre-working age population and a percentage increase in the post-working age population in a given period. Between 1996 and 2006, its value was 8.6 in Poland. In towns, it was almost twice larger than in rural areas (10.2 against 6.1).

As regards the rate's spatial distribution (Fig.8.), its values were high ( $\geq 5.0$ ) in rural areas with small shares of the post-working age population ( $\leq 14.6\%$ ) and low ( $\leq 4.9$ ) where the shares were large ( $\geq 14.7\%$ ). The rural areas of the Opolskie and Warmińsko-mazurskie voivodeships were strongly affected by population aging ( $\geq 6.5$ ). Rural areas situated in the western and southern voivodeships had islands of significantly advanced population aging processes. In eastern Poland the old-age rates were definitely the lowest ( $\leq 4.9$ ).

In the period 1996–2006, more than 10 communes out of 100 had very low old-age rates ( $\leq 3.2$ ). Likewise, more than 10 communes out of 100 had very high old age rates ( $\geq 8.9$ ). The other communes met the medium band criteria (3.3–8.8), with 51.6% of them being below the rate's average value and 48.4% above (the average was 6.1).

## CONCLUSION

The presented study of changes in the age structure of Polish population reveals that the rural areas form several dense regions with different characteristics of the changes. The most favourable situation can be observed in western Poland, where a higher level of 'servicisation', the related availability of better jobs and a better standard of living attract young, usually well-educated migrants. Inflows of such persons to rural areas boost local development and induce new inflows of persons at working age. As a result, western Poland has higher rates of the working-age population than the rest of the country does, as well as considerably lower shares of the post-working age population and lower aging indices. The rural areas in eastern Poland have been losing population and have been aging for several decades now. Their typical features are lower levels of socio-economic development, predominance of agriculture over other sectors and high rates of unemployment. Because good jobs are in short supply, young people decide to seek them outside while older, retired people usually stay at homes. This dramatically reduces natural increase and heightens mortality rates at the same time. The rural areas in southern Poland stand out in the country for their high natural increase

and large shares of the pre-working age population (Soja, 2002), which should be attributed to their populations' traditional approach to procreation that changes more slowly than elsewhere rather than the inflows of young population. High natural increase and thereby high shares of the pre-working age population are especially distinct in the north of the country. However, the relatively slow socio-economic transition, high unemployment and considerable poverty in that area force the mobile-age residents out, ultimately contributing to stronger population aging.

Age structures characterising populations inhabiting the suburbs of large urban centres are relatively young. Expanding suburbanization and a vogue for "living close to nature" make suburbs attractive to young people that already have their families or plan to have them soon. Procreative decisions carried out by persons working in towns but living in their suburbs rejuvenate the latter, increase their shares of the pre-working age population and reduce the proportion of persons at working age. Age structures in the touristically attractive areas and in the borderlands, mainly in western Poland, are similar, with high shares of the working-age population compared with the rest of the country. The economic characteristics of the areas, including busy economic life and higher availability of jobs, attract the working-age population.

The rural population in Poland behaves in a way that increasingly resembles the urban patterns, as suggested by decreasing rural reproduction and consumptionist lifestyle. Additionally, the improving availability of medical services in rural areas and their rising quality bring down mortality rates among rural residents. Because of that, the changes in the rural age structure follow those observed in towns. There is one additional factor, though, that favours the rural areas – the inflow of working-age persons from towns (frequently families with children). The positive effects of the phenomenon range from the relatively high shares of the working age and pre-working age populations to the decreasing proportions of persons at post-working age that ultimately reduce the aging index and decelerate population aging in rural areas vis-à-vis towns.



Tab.1. Major characteristics of rural communes and the rural parts of mixed urban-rural communes in Poland in 1996, 2001 and 2006

| <b>A</b>     |                  |             |             |
|--------------|------------------|-------------|-------------|
|              | <b>1996</b>      | <b>2001</b> | <b>2006</b> |
| ≥ 25.4       | 91.2             | 69.4        | 14.8        |
| 23.4 – 25.3  | 6.8              | 20.8        | 30.0        |
| 21.9 – 23.3  | 1.0              | 6.7         | 23.9        |
| 19.9 – 21.8  | 0.6              | 2.3         | 21.9        |
| ≤ 19.8       | 0.4              | 0.8         | 9.4         |
| <b>B</b>     |                  |             |             |
|              | <b>1996</b>      | <b>2001</b> | <b>2006</b> |
| ≥ 63.7       | 0.2              | 0.7         | 17.5        |
| 61.5 – 63.6  | 0.7              | 4.1         | 28.7        |
| 59.6 – 61.4  | 3.0              | 13.8        | 22.8        |
| 57.4 – 59.5  | 10.0             | 30.6        | 20.1        |
| ≤ 57.3       | 86.1             | 50.9        | 10.8        |
| <b>C</b>     |                  |             |             |
|              | <b>1996</b>      | <b>2001</b> | <b>2006</b> |
| ≥ 21.3       | 8.4              | 8.0         | 7.1         |
| 17.5 – 21.2  | 22.3             | 23.3        | 22.8        |
| 14.7 – 17.4  | 26.3             | 29.6        | 29.6        |
| 12.5 – 14.6  | 25.9             | 24.8        | 25.1        |
| ≤ 12.4       | 17.1             | 14.3        | 15.4        |
| <b>D</b>     |                  |             |             |
|              | <b>1996</b>      | <b>2001</b> | <b>2006</b> |
| ≥ 131.9      | 0.4              | 0.7         | 1.7         |
| 89.2 – 131.8 | 4.4              | 6.8         | 15.8        |
| 70.8 – 89.1  | 13.9             | 19.7        | 26.6        |
| 56.3 – 70.7  | 23.3             | 28.0        | 28.2        |
| ≤ 56.2       | 57.9             | 44.8        | 27.7        |
| <b>E</b>     |                  |             |             |
|              | <b>1996–2006</b> |             |             |
| ≥ 8.9        | 10.6             |             |             |
| 6.5 – 8.8    | 21.1             |             |             |
| 5.0 – 6.4    | 26.3             |             |             |
| 3.3 – 4.9    | 29.9             |             |             |
| ≤ 3.2        | 12.1             |             |             |

Explanation: A – % of communes within particular percentage bands of the pre-working age population, B – % of communes within particular percentage bands of the working age population, C – % of communes within particular percentage bands of the post-working age population, D – % of communes within particular bands of the aging index, E – % of communes within particular bands of the old-age rate

Source: Developed by the authors based on data available at the Central Statistical Office and [www.stat.gov.pl](http://www.stat.gov.pl)

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